

WHAT IS CLAIMED IS:

1. A method of treating chemical cellulose pulp produced by alkaline delignification and having a kappa number of under 24, having hexenuronic acid therein, comprising the steps of:

(a) treating chemical cellulose pulp produced by alkaline delignification having a kappa number under 24 by removing at least 50% of the hexenuronic acid from the pulp; and

(b) bleaching the chemical cellulose pulp produced by alkaline delignification having a kappa number under 24 in at least one bleaching stage.

2. A method as recited in claim 1 wherein step (a) is practiced by treating the pulp at a temperature over 85°C and at a pH between about 2-5 for sufficient time to remove at least 50% of the hexenuronic acid and to reduce the kappa number by at least 2 units.

3. A method as recited in claim 2 wherein step (a) is practiced for at least a time t, where  $t = 0.5 \exp(10517/(T+273)-24)$ , in minutes, and where T is the treatment temperature in degrees C.

4. A method as recited in claim 2 wherein step (b) is practiced by bleaching the pulp with chemicals reacting electrophilically in at least one stage, and wherein step (a) is practiced before step (b).

5. A method as recited in claim 4 wherein step (b) is practiced by chlorine, chlorine dioxide, ozone, or peracid bleaching.

a 1 6. A method as recited in claim ~~3~~<sup>1</sup> wherein step (a) is practiced  
2 with the pulp at a consistency of between 1-20%.

a 1 7. A method as recited in claim ~~6~~<sup>1</sup> wherein step (a) is practiced  
2 at a temperature of between about 90-110°C, and a pH of between  
3 about 2.5-4.

a 1 8. A method as recited in claim ~~7~~<sup>1</sup> wherein step (a) is practiced  
2 by controlling the pH by the addition of an inorganic or organic acid,  
3 and at a temperature over 100°C.

1 ~~9. A method as recited in claim 2 wherein step (a) is practiced~~  
2 ~~for between 5 minutes to 10 hours.~~

a 1 10. A method as recited in claim ~~9~~<sup>1</sup> wherein step (a) is practiced  
2 for sufficient time to remove at least 80% of the hexenuronic acid.

1 11. A method as recited in claim 10 wherein step (a) is  
2 practiced at a temperature of between about 90-110°C and a pH of  
3 between about 3-4 for between 10-240 minutes.

1 12. A method as recited in claim 1 wherein the pulp treated in  
2 step (a) is hardwood pulp having a kappa number of about 14 or less.

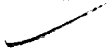
1           13. A method as recited in claim 1 wherein step (b) is practiced  
2 by bleaching the pulp in an ozone stage, followed by at least one  
3 additional bleaching stage.

a           14. A method as recited in claim 1 wherein step (b) is practiced  
2 by bleaching the pulp with a single hydrogen peroxide stage, and no  
3 other bleaching stages, to produce pulp having a <sup>post color</sup>~~pc~~ number of less  
4 than 2.

1           15. A method as recited in claim 1 wherein step (b) is practiced  
2 by bleaching the pulp in an oxygen stage, followed by at least one  
3 additional bleaching stage.

a           16. A method as recited in claim 1 wherein step (a) is practiced  
2 to reduce the kappa number about 3-6 units, and to remove at least  
3 80% of the hexenuronic acid, and so that the pulp produced has a <sup>post color</sup>~~pc~~  
4 number less than 2.

1           17. A method as recited in claim 3 comprising the further step  
2 of delignifying the pulp with oxygen prior to step (a) so that it has a  
3 kappa number of about 14 or less; and wherein step (b) is practiced  
4 after step (a).

1           18. A method of producing chemical cellulose pulp, comprising  
2 the steps of: 

3 (a) effecting alkaline delignification of comminuted cellulosic  
 4 fibrous material to produce chemical cellulose pulp having a kappa  
 5 number of under 24, and having hexenuronic acid therein;

6 (b) treating the chemical cellulose pulp from step (a) at a  
 7 temperature of between about 90-180°C and at a pH between about 2-  
 8 5 for at least a time  $t$ , where  $t = 0.5 \exp(10517/(T+273)-24)$ , in  
 9 minutes, and where  $T$  is the treatment temperature in degrees C, to  
 10 remove at least 50% of the hexenuronic acid from the pulp; and

11 (c) bleaching the chemical cellulose pulp from step (a) in at least  
 12 one bleaching stage prior to, simultaneously with, or after step (b).

1 19. A method as recited in claim 18 wherein step (b) is  
 2 practiced at atmospheric pressure for a time between 10-360 minutes,  
 3 or at super atmospheric pressure and a temperature of over 100°C for  
 4 a time between 5-100 minutes, and to remove about <sup>80</sup>~~90~~-97% of the  
 5 hexenuronic acid.

1 20. A cellulose chemical pulp produced by the steps of:

2 (a) effecting alkaline delignification of comminuted cellulosic  
 3 fibrous material to produce chemical cellulose pulp having a kappa  
 4 number of under 24, and having hexenuronic acid therein;

5 (b) treating the chemical cellulose pulp from step (a) at a solids  
 6 consistency between 0.1-50% at a temperature of between about 90-  
 7 180°C and at a pH between 2.0-5.0 for at least a time  $t$ , where  $t = 0.5$   
 8  $\exp(10517/(T+273)-24)$ , in minutes, and where  $T$  is the treatment  
 9 temperature in degrees C, to remove at least 50% of the hexenuronic  
 10 acid from the pulp; and

a 11 (c) bleaching the chemical cellulose pulp from step (a) in at least  
 12 one bleaching stage prior to, ~~simultaneously with~~, or after step (b), so  
 13 that the pulp has a brightness of at least about 80 ISO.

1 21. A cellulose chemical pulp as recited in claim 20 wherein step  
 2 (c) is practiced using hydrogen peroxide, and wherein the ~~pc~~ <sup>post color</sup> number of  
 3 the pulp is less than two.

add  
A2

add  
C'